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From Respiratory Distress to Spontaneous Relief: The Case of a Fractured Tracheostomy Tube

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Abstract **Case Report**

Tracheostomy is a widely accepted procedure for maintaining airway patency, but it can lead to both early and late complications. While rare, tracheostomy tube (TT) fracture is a serious complication that may occur, particularly in patients who have used the device for an extended period. We report the case of a patient with a long-term metal tracheostomy tube who presented to the emergency department with acute dyspnea due to the fragmentation and displacement of the TT into the tracheobronchial tree. This unusual event prompted urgent intervention for foreign body removal. After stabilization, a chest X-ray confirmed the position of the fractured tube, and although bronchoscopic removal was planned, the patient was able to expel the broken tube spontaneously following a vigorous coughing effort. This case highlights the importance of careful monitoring in long-term tracheostomy patients, as well as the potential risks associated with prolonged use of tracheostomy tubes. Regular cleaning, routine surveillance, and scheduled replacement of the tube are critical preventive measures to reduce the risk of such complications.

Keywords: Tracheostomy, Tracheostomy Tube Fracture, Respiratory Distress, Foreign Body Aspiration, Airway Management.

INTRODUCTION

Tracheostomy is a widely accepted procedure for airway management in patients requiring prolonged intubation. Although generally considered safe, it can be associated with various complications, both early and late in the course of treatment. Among these, tracheostomy tube (TT) fracture is a relatively rare but potentially serious complication, especially in patients who have had long-term use of the device. Such fractures can lead to severe risks, including airway obstruction and foreign body aspiration. Here, we present the case of a fracture of a Krishaber-type metal tracheostomy tube, which migrated into the tracheobronchial tree, causing respiratory distress and necessitating urgent intervention.

CASE REPORT

A 60-year-old male patient, previously followed for an epidermoid carcinoma of the vocal cords four years ago, had initially been recommended for surgical treatment. However, he declined the surgical option and opted for palliative care. Two years later, the patient developed laryngeal dyspnea, leading to a tracheostomy.

The patient subsequently presented to the emergency department with acute respiratory distress.

Upon arrival, he was promptly stabilized with nebulized adrenaline and intravenous corticosteroids. His oxygen saturation (SpO2) was measured at 85% on room air before any interventions.

Clinical examination suggested a possible fracture of the Krishaber tracheostomy tube within the tracheostomy stoma. After initial stabilization, a chest X-ray was performed, which confirmed the diagnosis of a fractured tracheostomy tube and its migration into the tracheobronchial tree (Fig. 1).

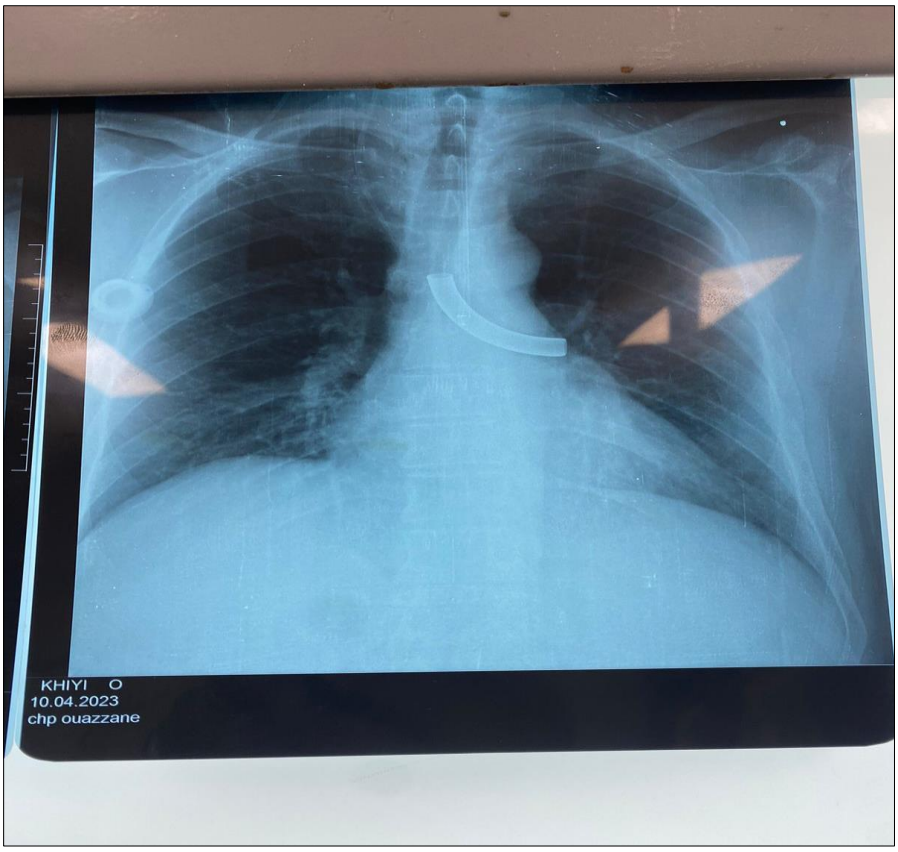

Figure 1: X-ray showing the fractured tracheostomy tube in the tracheobronchial tree.

Given the severity of the situation, the decision was made to admit the patient to the operating room for foreign body extraction.

However, before the scheduled procedure, during a spontaneous coughing effort, the patient unexpectedly expelled the fractured metal tube (Fig. 2), obviating the need for surgery.

Figure 2: Fractured tracheostomy tube expelled by the patient during a coughing effort, compared to an intact Krishaber tracheostomy tube.

The patient's condition rapidly improved, with his SpO2 rising to 99% on room air. He was then fitted with a new tracheostomy tube, and his respiratory status stabilized without further complications.

DISCUSSION

The first reported case of a tracheostomy tube fracture was by Bassoe and Boe in 1960, describing a broken tube as a foreign body [1].

Since then, although relatively rare, fractures of tracheostomy tubes have been documented, particularly in patients using them for extended periods. Early metallic tubes made from materials such as silver, copper, and zinc were susceptible to corrosion due to the alkaline nature of tracheal secretions and repeated cleaning. This issue led to the introduction of stainless steel, which offers better resistance to both corrosion and mechanical stress [2].

Recent studies have also explored the use of polymer-based materials, but metal remains the preferred choice due to its durability and availability [8].

Several factors can contribute to the fracture of tracheostomy tubes. These include manufacturing defects, mechanical stress, corrosion from bronchial secretions, exposure to disinfectants like sodium hypochlorite, and repeated sterilization or cleaning [2].

In our case, the fracture occurred at the neck of the tube, which is a known weak point that is often subjected to mechanical stresses. Otto and Davis (1985) noted that the fracture usually happens at these stress-prone areas, particularly when the tube has been in place for an extended period [3].

Other studies have highlighted the role of tube aging, repeated insertion and removal, and the long-term wear and tear that increase the risk of tube fractures [9].

The migration of fractured tracheostomy tubes into the tracheobronchial tree is a recognized but rare complication. The right mainstem bronchus is the most common site of migration, due to its anatomical characteristics, which include a wider lumen and more direct pathway from the trachea [5].

As seen in our case, the patient presented with acute respiratory distress, which was confirmed on chest radiography, showing the migration of the fractured tube into the bronchial tree. This highlights the importance of chest X-rays in diagnosing tube fractures, as the metal tubes are radiopaque and can be easily detected [7].

Additionally, other symptoms such as coughing, hemoptysis, and difficulty breathing can occur in cases of fractured tubes, and these should be part of the differential diagnosis when patients with long-term tracheostomies present with respiratory distress [10].

Rigid bronchoscopy is the gold standard for removing foreign bodies such as fractured tracheostomy tubes, and this technique allows for adequate ventilation and the introduction of instruments necessary for removal [2].

Most cases of fractured metallic tubes can be managed successfully with bronchoscopy, and only in rare instances is more invasive surgery, such as thoracotomy or bronchotomy, required [5].

In our case, the tube was spontaneously expelled by the patient during a coughing effort, which is an exceptional outcome. This rare event was similarly observed by Piromchai *et al*., who reported spontaneous expulsion of a fractured tube in a pediatric patient [4].

While spontaneous expulsion is not common, it underscores the need to remain open to the possibility of non-surgical resolution, especially when the patient is stable and shows signs of improvement.

Effective tracheostomy tube care is essential in preventing complications like fractures. Regular cleaning of the tube, both externally and internally, is critical, and it is recommended to inspect the tube thoroughly during routine follow-up visits for any signs of damage or wear [2]. Agarwal and Agarwal suggest a regular replacement schedule every 3 to 6 months, although this may vary depending on the patient's condition, tube material, and the frequency of cleaning [5].

Early identification of corrosion or wear can help reduce the risk of tube fractures, but it remains a challenge to determine the ideal replacement timeline for each patient.

Recent literature has emphasized the importance of timely intervention and preventive measures. White *et al*., (2019) stressed that although fractures of tracheostomy tubes are uncommon, they can have serious consequences if undiagnosed or delayed in management. Regular monitoring and appropriate patient education on tracheostomy care can reduce complications and improve long-term outcomes [11].

Furthermore, advancements in bronchoscopy techniques have enhanced the success of foreign body removal, reducing the need for more invasive surgeries and improving the overall safety of these procedures [12].

With the increasing number of patients requiring long-term tracheostomies, both for chronic respiratory conditions and after surgical interventions, ongoing updates to clinical protocols for tracheostomy tube care are necessary to address emerging complications and optimize patient management.

CONCLUSION

This case illustrates a rare but significant complication of long-term tracheostomy tube use: the fracture and migration of a metallic tube. While such fractures are uncommon, they can lead to serious respiratory distress, as demonstrated by our patient, who experienced acute dyspnea due to the migration of a fractured Krishaber tube. Remarkably, the patient was

able to expel the fractured tube through a coughing effort, avoiding the need for invasive intervention.

This fortunate outcome highlights the importance of early diagnosis and proper management of tracheostomy-related complications. Regular tube replacement and vigilant monitoring are essential to minimize the risk of fractures. Although bronchoscopy is typically required for foreign body removal, this case reminds us that spontaneous resolution can occasionally occur, emphasizing the unpredictability of tracheostomy-related complications.

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